

WHAT IS CLAIMED:

- 1 1. A method for communicating pulses positioned in time in accordance with a
2 time layout, comprising:
3 transmitting a pulse train signal comprising at least one pulse having at least
4 one predefined pulse characteristic, wherein a predefined pulse characteristic corresponds to
5 an arrival time of the at least one pulse at a receiver;
6 recovering a received pulse train signal in accordance with the arrival time of
7 the at least one pulse;
8 measuring one or more interference samples at one or more interference
9 sample times that do not coincide with an arrival time;
10 modifying the received pulse train signal in accordance with a measured
11 interference sample; and
12 varying at least one of said one or more interference sample times until one or
13 more received signal quality measures satisfy a predefined signal quality criterion.
- 1 2. The method of claim 1, wherein one or more arrival times are relative to one
2 or more interference sample times.
- 1 3. The method of claim 1, wherein modifying the received pulse train signal
2 includes removing interference in accordance with an interference sample.
- 1 4. The method of claim 1, wherein the received pulse train signal is recovered by
2 correlating a template signal at an arrival time of a pulse.
- 1 5. The method of claim 1, wherein the received pulse train signal is recovered by
2 correlating a template signal with a plurality of arrival times of a plurality of pulses to
3 produce an information signal.
- 1 6. The method of claim 1, wherein a received signal quality measure corresponds
2 to at least one of a:
3 signal strength value,
4 bit-error-rate, and
5 signal-to-noise ratio.

1 7. The method of claim 1, wherein a received signal quality measure pertains to
2 at least one of:

3 the received pulse train signal; and

4 the received pulse train signal combined with at least one interference sample.

1 8. The method of claim 7, wherein the received signal quality measure is
2 determined for at least one of:

3 an individual pulse of the received pulse train signal,

4 a plurality of pulses of the received pulse train signal,

5 a subset of a plurality of pulses of the received pulse train signal, and

6 all of the pulses of the received pulse train signal.

1 9. The method of claim 1, wherein the received signal quality measure is
2 determined periodically.

1 10. The method of claim 1, wherein an interference sample time is a discrete time
2 position.

1 11. The method of claim 1, wherein an interference sample time is a sample time
2 duration.

1 12. The method of claim 11, wherein a sample time duration is modified until the
2 predefined signal quality criterion is satisfied.

1 13. The method of claim 12, wherein an interference sample is measured by
2 correlating a template signal over each sample time duration.

1 14. The method of claim 13, wherein the shape of the template signal is varied.

1 15. The method of claim 1, wherein the received pulse train signal is modified in
2 accordance with at least one of a weighting factor and a weighting factor curve.

1 16. The method of claim 1, wherein varying an interference sample time
2 comprises shifting the interference sample time.

1 17. The method of claim 16, wherein the interference sample time is shifted
2 randomly.

1 18. The method of claim 16, wherein the interference sample time is shifted in
2 accordance with an interference sample time shift increment.

1 19. The method of claim 18, wherein the interference sample time shift increment
2 is a variable increment.

1 20. The method of claim 19, wherein the interference sample time shift increment
2 is increased.

1 21. The method of claim 19, wherein the interference sample time shift increment
2 is decreased.

1 22. The method of claim 16, wherein the interference sample time is shifted using
2 at least one of a:

3 Newton-Raphson method,
4 steepest descent method,
5 secant method,
6 conjugate gradients method,
7 first derivative test method, and
8 second derivative test method.

1 23. The method of claim 16, wherein the interference sample time is shifted to a
2 time determined by interpolation based on a number of received signal quality measures.

1 24. The method of claim 16, wherein the interference sample time is shifted to a
2 time determined by extrapolation based on a number of received signal quality measures.

1 25. The method of claim 1, further comprising:
2 varying the number of interference samples.

1 26. The method of claim 25, wherein the number of interference samples is varied
2 randomly.

1 27. The method of claim 1, wherein a predefined pulse characteristic comprises at
2 least one of: pulse amplitude, pulse width, pulse polarity; and pulse type.

1 28. The method of claim 1, wherein the arrival time of the at least one pulse is
2 specified by a code element of a code.

1 29. The method of claim 1, wherein the interference sample time is specified by a
2 code element of a code.

1 30. The method of claim 1, wherein the arrival time of the at least one pulse and
2 the interference sample time are specified by code elements of a code.

1 31. A method for communicating pulses positioned in time in accordance with a
2 time layout, comprising:
3 transmitting a pulse train signal having pulses positioned in time in accordance
4 with code elements of a first code;
5 receiving the pulse train signal in accordance with code elements of a second code,
6 wherein the code elements of the second code comprise the code elements of the first code
7 and additional code elements.

1 32. The method of claim 31, further comprising:
2 measuring interference samples at times specified by the additional code
3 elements of the second code to remove interference from the received pulse train signal.

1 33. The method of claim 31, wherein a code element of the first code corresponds
2 to an arrival time and an additional code element corresponds to an interference sample time.

1 34. The method of claim 31, further comprising:
2 determining a received signal quality measure for the received pulse train
3 signal; and
4 varying the additional code elements of the second code until a predefined
5 quality criterion is satisfied.

1 35. A method of coding interference sample times, comprising the steps of:
2 producing a first code having a plurality of code elements that specify a
3 position in time of a plurality of pulses in accordance with a layout; and
4 producing a second code having at least one additional code element from said
5 first code wherein the at least one additional code element specifies an interference sample
6 time in accordance with the layout.

1 36. A method of coding interference sample times, comprising:
2 producing a code having at least one code element that specifies an interference
3 sample time in accordance with a layout.

1 37. A method for communicating pulses positioned in time in accordance with a
2 time layout, comprising:
3 transmitting a pulse train signal having pulses positioned in time in accordance
4 with code elements of a first code;
5 receiving a subset of the pulse train signal in accordance with code elements
6 of a second code, wherein the code elements of the second code comprise a subset of the code
7 elements of the first code.

1 38. A method for communicating pulses positioned in time in accordance with a
2 time layout, comprising:
3 transmitting a pulse train signal having pulses positioned in time in accordance
4 with code elements of a first code;
5 receiving the pulse train signal in accordance with code elements of the first
6 code;
7 measuring interference samples at times specified by code elements of a second code
8 to remove interference from the received pulse train signal.